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# Wildland Fire Interface Survey

*Managing the Woods Today to Manage the Fire Tomorrow*

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*Managing the Woods Today to Mange the Fire Tomorrow*

## Introduction

2000 was the "year of the fire" for Department of Energy (DOE) facilities. Lawrence Livermore National Laboratory was shut down for 10 days and DOE's Hanford site was shut down for three days as the results of wildland fires. These incidents emphasize the need for Wildland Interface Zones to be defined and the adjoining woods to be managed. BNL has over 3,000 acres of woodland property with many major facilities along the wildland interface zone. In addition to impacting the entire site and the experimental programs, a large fire could involve bordering communities and their homes. This analysis documents BNL's structures along the interface zone, defines minimum levels protective measures that are needed to reduce fire damage, and identifies prudent corrective actions needed to prepare for survival.

## Methodology

### Determining the Wildland Interface Zone

To define what facilities were on the Wildland Interface Zone, the term "Wildland Interface" needed to be defined. The 2000 Urban-Wildland Interface Code[1] provided the following definition for a term used in their code:

> **Urban-Wildland Interface Area** is that geographical area where structures and other human developments meets or intermingles with wildland[2] or vegetative fuels.

The next step in the project was to develop an initial list of facilities based on office information. BNL site maps included an AutoCAD layer for the tree lines. This was based on aerial photographs and may not have been accurate, but was an initial starting point.

From the list of facilities that adjoined directly to wildland areas, a visit was made to verify the field conditions. A field inspection was used to verify the conditions. The list was then updated.

To evaluate the facilities level of protection against a wildland fire, literature research was conducted. The National Fire Protection Association's National Fire Code Pamphlet 299, "Standard for Protection of Life and Property from Wildland Fires " provided the majority of information regarding risk evaluations. The joint agency for wildland land fire education, www.firewise.org, provided details on facility configuration for protection against wildland fire damage. From these two sources, a checklist was compiled and used during facility inspection.

[1] "2000 Urban Wildland-Interface Code," International Fire Code Institute, Whittier, California

[2] According to the 2000 Urban- Wildland Interface Code, **Wildland** is and area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities.

The most important elements protecting a structure against damage from a wildland fire are 1) non-combustible construction, and 2) distance from the vegetation. Non-combustible roofing is the most significant factor due to its ability to resist ignition from burning brands that shower from the sky over entire blocks of area during wildland fires. Distance from the woods, on the other hand, protects the facilities from radiant heat and its ignition mechanics. The separation distance was formerly called “Defensible Space” due to the implication that the fire department could intercede. The term more recently used is “Survivable Space,” which eliminates the dependence on manual suppression and implies that the distance alone provides the protection.

This report presents the BNL list of facilities, their status with respect to the protective measures, and highlights needed improvements.

## Wildland Interface Survey

### Sample Wildland Fire Interface Survey Building Checklist (Based on NFPA 299 & www.firewise.org)

***Insert Building Number***

**A)**Means of Ingress and Egress
- **1)**__X___ sufficient
- **2)**_____ insufficient**
  - **a)**_____two or more roads
  - **b)**__X___one way in and out
- **3)**Size of Road
  - **a)**___X___>20 ft. wide
  - **b)**_____ <20 ft. wide

**B)**Signs
- **1)**_____ not present**
- **2)**__X___ present
  - **a)** if present are they legible (meeting with NFPA codes)

**C)**Building Construction
- **1)**__X___ low (class A roof, noncombustible siding and roof)
- **2)**_____ moderate (class B roof, noncombustible siding and roof)
- **3)**_____ high (class C or nonrated roof, combustible siding and deck)

**D)**Additional Building Construction
- **1)**_____ not present
- **2)**__X__present (class A,B,C)

**E)**Vegetation and Landscape
- **1)**_____ not maintained**
- **2)**__X___ maintained
  - **a)** if so explain.... adequate or not.

**F)**Survivable Space
- **1)**__X___ urban intermix
- **2)**_____ urban interface
- **3)**Distance from Woodland
  - **a)**_____ > 100 ft.
  - **b)**_____ 30- 70 ft.
  - **c)**__X___ < 30 ft.(no survivable space)**
- **4)**Slope
  - **a)**___X__ < than 9%
  - **b)**_____ between 10% and 20%
  - **c)**_____ between 21% and 30%
  - **d)**_____ between 31% and 40%
  - **e)**_____ > than 41%**

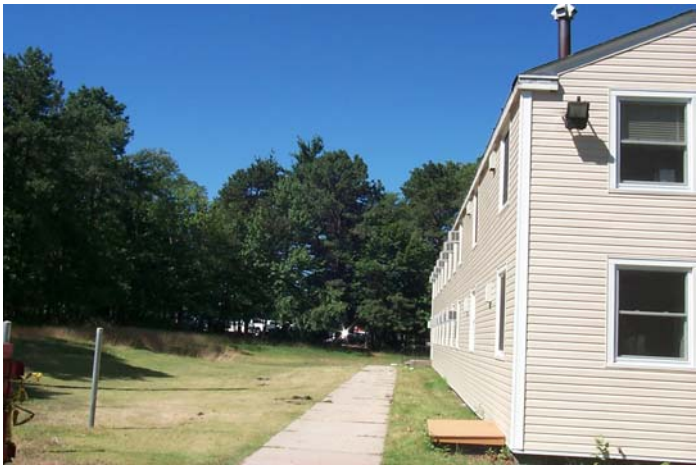
**G)**Water Availability
- **1)**_____ no**
- **2)**__X___ yes(distance ft.)
  - **a)** 75 ft. (915)
  - **b)** 175 ft. (916)
  - **c)** 275 ft. (917)

**** must explain why the problem is as such and ways to solve the problem.**

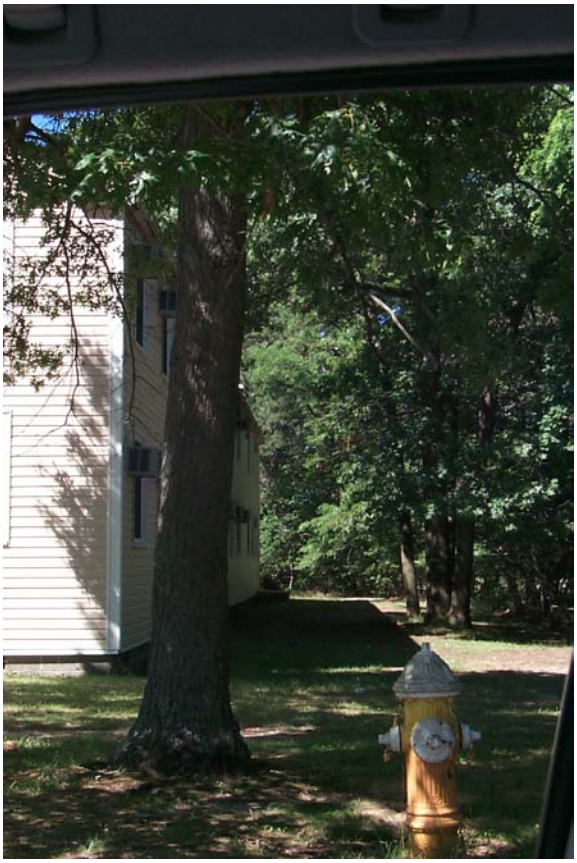
**Comments:**

-- even though the woodland surrounds three sides of them, they are so small that if they do go and we can't put them out, we shouldn't be firemen.
-- they are easily accessible so can be put out very quickly.
--the roads should be labeled better for more efficient access to them.

## Photographs of Sample Concerns and Issues



- Figure 1 Preferred clearance to the tree line to allow fire department intervention and control (Bldg 153)

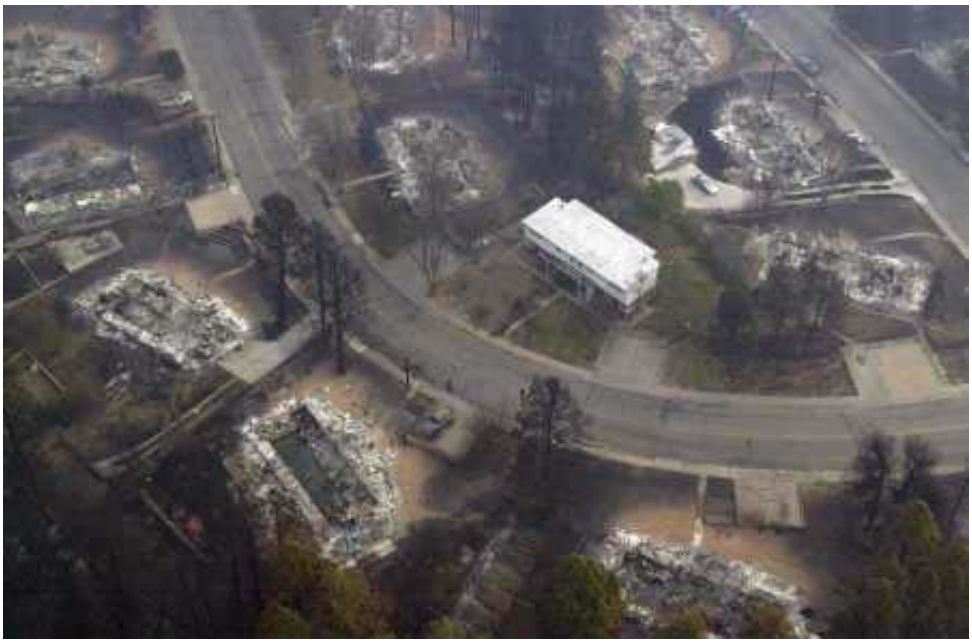


- Figure 2 Another side of Bldg 153 showing insufficient protective clearance and endangering the buidling

Figure 3 Apartment Area "Efficiency" Apartments with woods and tree canopy encroaching on buildings


- Figure 4 Sample sign that provides clear direction and identification to fire department response

- Figure 5 Up hill ground slope at RHIC that increase the fire hazard to a facilitiesl



- Figure 6 Spared Building (non-combustible roof and clearance to the tree line) versus less fortunate homes

# Wildland Interface Zone Survey

| Bldg. Number | Bldg. Name | Ingress/Egress | | Identification of Buildings (Signs) | Bldg Fire Resistance | | Survivable Space | | | Availabilty of Fire fighting water |
|---|---|---|---|---|---|---|---|---|---|---|
| | | More than one road | Road > 20 Ft. | | Roofing Combustility | Siding and Deck Combustiblity | Satisfactory Vegetation and Landscape | Closest Distance to Woods (ft.) | Maximum Slope (%) | |
| **30** | BROOKHAVEN CENTER | Yes | Yes | No | Low | Low | Yes | 30-70 | 21-30 | Good |
| **50** | POLICE HEADQUARTERS | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **51** | OER/ATMOSPHERIC | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **170** | COMPTON-MENS RESID | No | Yes | No | Low | Low | Yes | <30 | 21-30 | Good |
| **180** | FLEMING-MENS RESID | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **244** | BLDGING MAINTENANCE SHOP | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **257** | GUEST HOUSE | Yes | Yes | No | Low | Moderate | No | <30 | <9 | Good |
| **258** | CURIE-WOMEN'S RESIDNCE | Yes | Yes | No | Low | Moderate | No | <30 | <9 | Good |
| **302** | APARTMENT 28 | Yes | Yes | No | Low | Moderate | Yes | 30-70 | <9 | Good |
| **303** | APARTMENT 34 | Yes | Yes | No | Low | Moderate | Yes | 30-70 | <9 | Good |
| **304** | APARTMENT STORAGE | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **306** | APARTMENT 13 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **307** | APARTMENT 11 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **324** | APARTMENT 9 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **325** | APARTMENT 7 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **327** | APARTMENT 24 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **328** | APARTMENT 26 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **330** | APARTMENT 8 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **331** | APARTMENT 10 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **334** | APARTMENT 30 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **335** | APARTMENT 36 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **348** | CALIBRATION | Yes | Yes | Yes | Low | Moderate | No | <30 | <9 | Good |
| **349** | APARTMENT 2 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **350** | APARTMENT 4 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **351** | APARTMENT 6 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **359** | APARTMENT 5 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **360** | APARTMENT 3 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **361** | APARTMENT 1 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **362** | APARTMENT 22 | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **363** | COIN LAUNDRY | Yes | Yes | Yes | Low | Moderate | Yes | 30-70 | <9 | Good |
| **364** | APARTMENT 40 | Yes | Yes | Yes | Low | Low | Yes | 30-70 | <9 | Good |
| **365** | APARTMENT 41 | Yes | Yes | Yes | Low | Low | Yes | 30-70 | <9 | Good |
| **366** | APARTMENT 42 | Yes | Yes | Yes | Low | Low | Yes | 30-70 | <9 | Good |
| **367** | APARTMENT 43 | Yes | Yes | Yes | Low | Low | Yes | 30-70 | <9 | Good |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **0368-01** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-02** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-03** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-04** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-05** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-06** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-07** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-08** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-09** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-10** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-11** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-12** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-13** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-14** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-15** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-16** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-17** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-18** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-19** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-20** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-21** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-22** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-23** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-24** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-25** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-26** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-27** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-28** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-29** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0368-30** | SUMMER COTTAGE | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-09** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-10** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-11** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-12** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-13** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-14** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-15** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |
| **0369-16** | MOBILE HOME | No | No | No | Low | High | No | <30 | <9 | Good |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **373** | CHILD CARE FACILITY | Yes | No | Yes | Low | Low | No | 30-70 | <9 | Good |
| **405** | BUILDING STORAGE | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **422** | CABINET/SIGN SHOP | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **475** | REACTOR SAFETY | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **479** | MACHINE SHOP B | Yes | Yes | No | Low | Low | No | >100 | <9 | Good |
| **488** | BERKNER HALL | Yes | No | No | Low | Low | No | <30 | <9 | Good |
| **493** | VIDEO WORKS AREA | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **494** | BNL RECORDS HOLDING | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **495** | OIL DRUM STORAGE FACILITY | Yes | Yes | Yes | Low | Low | No | 30-70 | <9 | Good |
| **498** | CENTRAL DEGREASER | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **526** | ENERGY/LABS/STOR/CON | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **527** | COMBUSTION RESEARCH | Yes | Yes | No | Low | Low | No | >100 | <9 | Good |
| **528** | REACTOR SYSTEMS | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **590** | ENVMNTL MONTG STATION - P2 | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **591** | ENVMNTL MONTG STATION - P9 | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **592** | ENVMNTL MONTG STATION - S5 | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **593** | ENVMNTL MONTG STATION - S6 | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **0593A** | ENVMNTL MONTG STATION | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **594** | ENVMNTL MONTG STATION - P7 | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **595** | ENVMNTL MONTG STATION - HMNo | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **596** | ENVMNTL MONTG STATION - HMs | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **597** | ENVMNTL MONTG STATION - HQ | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **598** | GROUNDWATER TREATMENT | | | | Low | Low | Yes | >100 | <9 | Good |
| **599** | FIRE HOUSE | No | Yes | No | Low | Low | Yes | 30-70 | <9 | Good |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **624** | WATER TREATMT PLANT | No | Yes | No | Low | Low | Yes | 30-70 | 21-30 | Good |
| **642** | EQUIP STOR WATER TRT | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **835** | RHIC CRYO | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **915** | AGS WELL 101 | No | Yes | No | Low | Low | No | <30 | <9 | Good |
| **916** | AGS WELL 102 | No | Yes | No | Low | Low | No | <30 | <9 | Good |
| **917** | AGS WELL 103 | No | Yes | No | Low | Low | No | <30 | <9 | Good |
| **926** | RECEIVING/WAREHOUSE | Yes | Yes | No | Low | Low | Yes | <30 | <9 | Good |
| **930** | 200 MEV LINAC | Yes | No | No | Low | Low | No | <30 | >41 | Good |
| **935** | BNL SCIENCE MUSEIUM | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **936** | EQUIPMENT STORAGE | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **959** | ENVMNTL MONTG STATION - HTe | Yes | Yes | No | Low | Low | No | <30 | <9 | Good |
| **1002** | BRAHMNS EXPERIMENTAL HALL | Yes | Yes | No | Low | Low | No | <30 | 21-30 | Good |
| **1002A** | INSTRUMENTATION / BRAHMNS SER | Yes | Yes | No | Low | Low | No | <30 | 21-30 | Good |
| **1002B** | 2:00 CRYO SERVICE BUILDING | Yes | Yes | No | Low | Low | No | <30 | 21-30 | Good |
| **1002C** | FAST ELECTRONIC HUT | Yes | Yes | No | Low | Low | No | <30 | 21-30 | Good |
| **1002D** | BRAHMS COUNTING HOUSE | Yes | Yes | No | Low | Low | No | <30 | 21-30 | Good |
| **1008B** | 8:00 CRYO / PHENIX MAGNET SER | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **1008C** | CHILLER FACILITY | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |
| **1101** | ASSEMBLY BUILDING | Yes | Yes | No | Low | Low | No | 30-70 | <9 | Good |

**General Note** This table is based on elements and risk factors described in NFPA 299, Table A-3-2(a) Wildfire Hazard Severity Form Checklist
**Orange boxes indicate conditions warranting corrective action.**

**Defination**

| | |
|---|---|
| *Building Number* | Offical number assigned by Plant Engineering |
| *Building Name* | Offical name assigned by Plant Engineering |
| *Ingress/Egress* | Factors effecting escape of building occupants as well as simultanous access by fire department equipment |
| *Identification of Buildings* | Adequate signage to identify a facility to fire department units, which may include Non BNL Fire Departments on site to assist in suppression |
| *Building Fire Resistance* | One of two main facotrs effecting the risk to a facitly from an external fire |
| *Roof Combustiblity* | Low = Underwriter's Laborotry Class A roof covering (Best), Medium = UL Class B roof, |
| *Siding and Deck Combustiblity* | Low = Noncombustible siding/deck (cinder block, abestos), Medium = low combustible material (vinyl siding on wood), High = Combustible (bare wood) |
| *Slope* | Second of two major factors effecting the risk to a facility from an external fire, measured |
| *Availabilty of Fire fighting water* | Good = 500 gpm minimum water source availability with 1000 ft. from pressurized hydrants, Fair = Sources within 20 min round-trip (hydrants or draft sources), Poor = Sources within 21-45 min round-trip (hydrants or draft sources) |